Claims

What is claimed is:

1. A process for producing synthesis gas comprising passing a hydrocarbon containing gas and an oxygen containing gas over a catalyst, under conditions effective to produce a gas stream comprising hydrogen and carbon monoxide, wherein the catalyst comprises:

(a) an alumina support comprising at least one modifying agent; and

(b) at least one catalytically active metal deposited on said alumina support, and wherein the alumina support has undergone a high temperature calcination in the presence of a precursor of the at least one modifying agent at a temperature equal to or greater than about 1000°C.

2. The process according to claim 1 wherein the high temperature calcination is performed at a temperature greater than 1000°C.

3. The process according to claim 1 wherein the alumina support has a surface area of greater than or equal to about 10 m^2/g after said high temperature calcination.

4. The process according to claim 1 wherein the catalyst comprises a metal surface area greater than 0.35 m^2/g of the catalyst.

5. The process according to claim 1 wherein the catalytically active metal is selected from the group consisting of Group VIII metals, rhenium, tungsten, zirconia, molybdenum and mixtures thereof.

6. The process according to claim 1 wherein the catalytically active metal comprises a metal selected from the group consisting of Rh, Ru, Ir, Re or mixtures thereof.

7. The process according to claim 1 wherein the catalytically active metal comprises rhodium.

8. The process according to claim 1 wherein the catalytically active metal comprises a rhodium alloy.

9. The process according to claim 1 wherein the modifying agent comprises at least one element selected from the group consisting of aluminum, boron, silicon, gallium, selenium, rare earth metals, alkali earth metals and transition metals, and their corresponding oxides and ions.

10. The process according to claim 1 wherein the modifying agent comprises at least one element selected from the group consisting of La, Al, Sm, Pr, Ce, Eu, Yb, Si, Mg, Co, their corresponding oxides, their corresponding ions, and combinations thereof.

11. The process according to claim 1 wherein the modifying agent comprises one element selected from the group consisting of aluminum, lanthanum, samarium, cobalt, magnesium, silicon, their corresponding oxides, their corresponding ions, and combinations thereof.

12. The process according to claim 1 wherein the process exhibits a hydrocarbon conversion equal to or greater than 80 %, and a hydrogen selectivity equal to or greater than 80 %, under operating conditions of at least greater than or equal to 2 atmospheres.

13. The process according to claim 1 wherein the process exhibits a hydrocarbon conversion equal to or greater than 85 %, and a hydrogen selectivity equal to or greater than 85 %, under operating conditions of at least greater than or equal to 2 atmospheres.

14. The process according to claim 1 wherein the process exhibits a loss in hydrocarbon conversion no greater than about 3% per day.

15. The process according to claim 1 wherein the process exhibits a loss in hydrogen selectivity no greater than about 1% per day.

16. A process for producing liquid hydrocarbons comprising:

(a) converting at least a portion of a feedstream comprising a hydrocarbon containing gas and an oxygen containing gas over a catalyst comprising an alumina support having at least one modifying agent and at least one catalytically active metal, under conditions effective to produce a gas stream comprising hydrogen and carbon monoxide,

wherein the alumina support has undergone a high temperature calcination with a temperature equal to or greater than about 1000°C in the presence of a precursor of the at least one modifying agent; and

(b) reacting at least a portion of the gas stream from step (a) in a hydrocarbon synthesis reactor under conditions effective to produce C_{5+} hydrocarbons.

17. The process according to claim 16 wherein the high temperature treatment is greater than 1100°C.

18. The process according to claim 16 wherein the catalyst comprises a metal surface area greater than 0.35 m^2/g of the catalyst.

19. The process according to claim 16 wherein the catalytically active metal is selected from the group consisting of Group VIII metals, rhenium, tungsten, zirconia, molybdenum and mixtures thereof.

20. The process according to claim 16 wherein the catalytically active metal comprises a metal selected from the group consisting of Rh, Ru, Ir, Re or mixtures thereof.

21. The process according to claim 16 wherein the catalytically active metal comprises rhodium.

22. The process according to claim 16 wherein the catalytically active metal comprises a Rh alloy.

23. The process according to claim 16 wherein Step (a) exhibits a hydrocarbon conversion equal to or greater than 80 %, and a hydrogen selectivity equal to or greater than 80 %, under operating conditions of at least greater than or equal to 2 atmospheres.

24. The process according to claim 16 wherein Step (a) exhibits a loss in hydrocarbon conversion no greater than about 3% per day.

25. The process according to claim 16 wherein Step (a) exhibits a loss in hydrogen selectivity no greater than about 1% per day.

26. The process according to claim 16 wherein the alumina support has a surface area of greater than or equal to about 10 m^2/g after said high temperature treatment.

27. The process according to claim 16 wherein the modifying agent comprises at least one element selected from the group consisting of aluminum, boron, silicon, gallium, selenium, rare earth metals, alkali earth metals and transition metals, and their corresponding oxides and ions.

28. The process according to claim 16 wherein the modifying agent comprises one element selected from the group consisting of aluminum, lanthanum, samarium, cobalt, magnesium, silicon, their corresponding oxides, their corresponding ions, and combinations thereof.